APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/994,122	11/26/2001	Siegfried Bocionek	P01,0429	7331

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EXAMINER
BULLOCK JR, LEWIS ALEXANDER

ART UNIT	PAPER NUMBER
2195	

DATE MAILED: 09/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

		Application No.	Applicant(s)
Office Action Summary		09/994,122	BOCIONEK, SIEGFRIED
		Examiner	Art Unit	
		Lewis A. Bullock, Jr.	2195	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>23 June 2006</u>.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-6</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-6</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a)☒ All   b)☐ Some *   c)☐ None of:

         1.☒ Certified copies of the priority documents have been received.

         2.☐ Certified copies of the priority documents have been received in Application No. _____.

         3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over "A

High Performance Computing Approach to the Registration of Medical Imaging Data" by

WARFIELD et al. in view of "Load Distributing for Locally Distributed Systems" by

SHIVARATRI et al and "Distribution of Image Processing Applications on a

Heterogenous Workstation Network. Modeling, Load-Balancing and Experimental

Results" by D. Hernandez-Sosa et al.

As to claim 1, WARFIELD teaches a medical system architecture (cluster of

symmetric multiprocessors) (abstract) comprising a plurality modalities for acquiring

medical examination images (pg. 1, The Role of Registration in the Analysis of Medical

Imaging Data, "Intrapatient registration is used for the integration of scans of a patient

from multiple imaging modalities (such as PET, SPECT, CT and MRI); a plurality

computer workstations (multiprocessors) respectively allocated to the modalities for

processing the respective medical examination images therefrom (via distributing re-

sampling and comparison operations across a cluster of symmetric multiprocessor;

abstract) (pg. 7, "Each node executes an SMP implementation of re-sampling and then

comparison on a subset of the data, and returns the comparison value to the main

process."); a transmission device connected to the computer workstations for

transmitting the medical examination images (via distributing re-sampling and

comparison operations across a cluster of symmetric multiprocessor; abstract) (pg. 7,

"Each node executes an SMP implementation of re-sampling and then comparison on a

subset of the data, and returns the comparison value to the main process."); a memory

connected to the transmission device for storing the medical examination images (via

the central storing of a workpile) (pg. 7, "A parallelization strategy suitable for this

environment is the workpile strategy. One process manages a workpile managing

access to the units of work and collating partial results, while other processes request

work units and carry out the work independently. This allows both slow nodes and fast

nodes to maximize the amount of work they do because it does not impose arbitrary

synchronization points on the work. It also dynamically reacts to changes at the rate at

which certain nodes can process jobs. "); wherein each of the workstations (processor /

node) contain a work list management unit in which a work list (work units) listing task

(computations) to be performed by that workstation is stored (pg. 7, "A parallelization

strategy suitable for this environment is the workpile strategy. One process manages a

workpile managing access to the units of work and collating partial results, while other

processes request work units and carry out the work independently. This allows both

slow nodes and fast nodes to maximize the amount of work they do because it does not

impose arbitrary synchronization points on the work. It also dynamically reacts to

changes at the rate at which certain nodes can process jobs. ") wherein the cluster

dynamically reacts to changes at the rate at which certain nodes can process jobs (pg.

7). However, Warfield does not teach a detector that determines and emits a detector output signal representing usage of the workstation dependent on a stored work list or that the processing involves processing performing a complete task on a workstation.

SHIVARATRI teaches a distributed load balancing scheme in any node system wherein all nodes uses information, i.e. state, acquired from other nodes during polling classify the other nodes as overloaded, underloaded, or OK nodes such that when the current node has a CPU queue length that is in violation with one of the thresholds the nodes transfers part of its load to another node (pg. 38-39, A stable symmetrically initiated adaptive algorithm). The work performed by SHIVARATRI would obvious be image processing functions. WARFIELD teaches that the image processing environment dynamically reacts to changes at which certain nodes can process jobs wherein the jobs perform image processing functions. It would be obvious to one of ordinary skill in the art that the teachings of WARFIELD when combined with the teachings of SHIVARARTRI would distribute work, i.e. the calculations of medical images from one processor to another processor based on the classified information of the processor as either overloaded, underloaded, or OK. Therefore, the combination would teach all of the workstations (processors / nodes) emiting a detector output signal representing usage of that workstation (i.e. its load / state) and a task generator associated with the receiving workstation (node receiving state / load) evaluating the usage indication in order to balancing the work from or to the node. Therefore, it would be obvious to one skilled in the art to combine the teachings of WARFIELD with the teachings of SHIVARATRI in order to facilitate improved load sharing abilities at low

system loads, and high loads while not causing system instability (pg. 43, Stable load-sharing algorithms).

SOSA teaches a plurality of workstations for processing the images involving modifying a content of the image being processed or post-processed (wherein task / computations of images are distributed to available machines to be processed based on the workload of the second process / available machine) (pg. 177-180). Therefore, it would be obvious to one of ordinary skill in the art to combine the teachings of WARFIELD with the teaching of SHIVARATRI and SOSA in order to facilitate the availability and frequent infra-utilization of image processing on a heterogenous workstation network (abstract).

As to claims 2-4, SHIVARARTRI teaches comparing the number of pending tasks to a threshold value and generating a signal (state information) to another node if the pending tasks (queue of work / queue length) falls below or exceeds a threshold (pg. 39, Transfer policy).

As to claim 5, WARFIELD teaches a server (master process managing the workpile) forwarding the images to respective workstations among the computer workstations (pg. 7, "We use a dynamic load balancing (self scheduling paralleliation..."). SHIVARARTRI teaches that a process manages its work in order to distribute it to other nodes if it is overloaded (pg. 38-39). It would be obvious that the node distributing its work is the server.

As to claim 6, reference is made to a method that corresponds to the system of

claims 1-5 and is therefore met by the rejection of claims 1-5 above.

Response to Arguments

3.   Applicant's arguments with respect to claims 1-6 have been considered but are

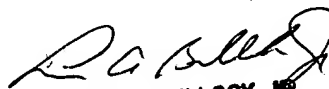moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Lewis A. Bullock, Jr. whose telephone number is (571)

272-3759. The examiner can normally be reached on Monday-Friday, 8:30 a.m. - 5:00

p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Meng An can be reached on (571) 272-3756. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the
Patent Application Information Retrieval (PAIR) system. Status information for
published applications may be obtained from either Private PAIR or Public PAIR.
Status information for unpublished applications is available through Private PAIR only.
For more information about the PAIR system, see http://pair-direct.uspto.gov. Should
you have questions on access to the Private PAIR system, contact the Electronic
Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a
USPTO Customer Service Representative or access to the automated information
system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

September 18, 2006

LEWIS A. BULLOCK, JR.
PRIMARY EXAMINER